



FINAL KY FACE #94KY161

Date: 8 February 1995

Subject: Log Loader Runs Over Worker at Stave Mill

SUMMARY

A 56 year-old-male stave edger was killed when he entered the path of a moving log loader at a saw mill. At 4:30 pm the day of the incident, the victim had completed an 8-hour shift in the mill. He walked out of the metal building toward the employee parking area. About 18 feet from the building he was struck by a loader, which was backing up. A witness and the loader driver ran to the victim and helped move him to some nearby logs. The victim was alive and conscious. He removed his ear plugs while waiting for the ambulance to arrive. First aid was administered at the scene by a physician, who was on the premises at the time. The victim was transferred by ambulance to the local hospital and subsequently air-lifted to a major medical center 70 miles away. He lived seven days, then died of acute cardiovascular collapse during surgery. The FACE investigator concluded that in order to prevent future fatalities of this type, saw mill owners and operators should:

- Offer training to include hearing conservation and instructions on the removal of hearing protection devices when leaving the work area.
- Install the loudest possible back-up audible warning systems available. Employers should also consider installing visible warning devices on the loaders.
- Employee training should include instructions on the hazards and necessary precautions associated with log loaders.
- Employers should consider diverting foot traffic away from loader path ways.

INTRODUCTION

On 17 November 1994, a 56-year-old male saw mill worker was injured when he was run over by a log loader. On 23 November 1994, the victim died in the operating room as a result of the injuries sustained in the run over. On 25 November 1994, the FACE investigator read of the incident in the newspaper and on 29 November 1994, the FACE investigator, along with a KY OSH compliance officer traveled to the scene. The company owners (3) were interviewed. The log loader driver, EMS personnel and the physician at the scene were all interviewed. An equipment dealer and manufacturer's representative were consulted regarding the case. Photographs of the scene and related equipment were taken and sound level measurements made. A copy of the OSH compliance report and death certificate were later reviewed. The Kentucky Department of Forestry and the Forestry Department at the University of Kentucky were consulted about the incident.

The family-owned saw mill has been in business at this location since 1976. This vertically-integrated, whiskey barrel manufacturer employs between 40 and 45 full-time workers. White oak logs are delivered to the site by independent log cutters. They are unloaded, debarked and cross-cut to 3' lengths. These segments are then halved and quartered. Band saws are then used to cut the quarters into 1" thick staves. The staves are then edged to random widths. This process continues 8 hours per day inside a metal building where 12 employees keep the line running. The staves are then stacked and taken to a kiln for drying. Once dried, barrels are constructed and the inside char-burned. Three hundred barrels are completed for quality testing

per day. Finished products are sold to distilleries. The company employs three other workers with similar responsibilities as the victim.

Safety meetings are conducted quarterly with all employees. Topics include eye protection, first aid, universal precautions, material safety data procedures, hearing protection and others. All new hires complete an orientation/training period where safety issues are discussed. The company owner is in charge of safety training and safety oversight. The employer provides ear plugs and eye protective equipment for all its workers. Individual position training is largely on the job. The OSHA 200 Log was current and reflected few reportable injuries. This was the second fatality at the site. Approximately 4 years prior, a logging contractor was killed when a log above the bolsters rolled off his truck and struck him.

The victim had worked for the company for 22 years. He had completed the same task as a stave edger for several years. Safety training courses were regularly attended by the victim and the loader driver. The victim's health was fair and co-workers reported he was a very active hunter and had other physical pursuits. He had been a heavy smoker but had quit one year prior to the incident. All employees on the line wore eye and ear protection on the day of the investigation. Tapered foam earplugs (noise rating 31 dBA) are provided by the employer. Routine hearing evaluations were not a part of the employer's health screening and therefore assessment of the victim's hearing was not available. The employer reports that audiometric tests are now a part of the company's safety and health practices.

INVESTIGATION

This manufacturer specializes in using white oak logs to make whiskey barrels. It covers a 12 acre site where logs are delivered, stacked and then processed. Several buildings including a mill, a kiln, an office, an assembly plant and equipment storage sheds dot the land. The victim was assigned to work in the mill. He was to take staves on the assembly line and trim the edges to random widths. The job is performed standing and involves manual manipulation of rough sawed pieces through a band saw. Work is performed inside a 50 x 90 metal building where the logs enter one end and rough sawn barrel staves and bottoms come out the other end. Two band saws, two circular saws, one circular cut off saw and a conveyer operate eight hours a day inside the mill. Noise measurements taken the day of the investigation were between 96 and 100 dBA near work stations inside the mill.

The equipment involved in the incident was a 3 year old Kawasaki 60Z II, 4-wheel drive (103 hp) log loader. This 18,000 pound loader was equipped with lift forks but no grippers. Its fluid-filled, 17.5 x 25 tires were on 8' 8" centers. The overall unit height was 10' 1". It was equipped with glass-enclosed ROPS and three convex mirrors, two mounted outside on the right and left, and one inside in the center. On the day of the investigation, the windows were clean. Reports from the employer indicate the unit's windows are cleaned prior to every shift. The liquid-cooled axle brakes functioned properly on the day of the investigation. A 24-volt, factory installed, audible back-up warning device (107 dBA rating) was working the day of the investigation. The horn operated by the driver worked on the day of the investigation as well. When checked by the investigator, the audible signal measured 93 dBA six feet from the unit. According to the manufacturer, without modifications, the log loader operates at 82-85 dBA. This level was confirmed the day of the investigation.

A chipper sits about 40 feet from the mill. Scraps are delivered to the chipper several times per day using a log loader. The chipper operates at 110 dBA at the work station and about 100 dBA 15 feet from the unit.

At 4:30 pm on the day of the incident, the sky was overcast, the temperature about 50 degrees and the victim had just completed his shift in the mill. The assembly line had been shut down for the day. Talks with

co-workers earlier in the day led them to believe the victim was going hunting that evening. He walked out of the wide door at the mill entrance and preceded about 18 feet toward the employee parking lot. He was hit and run over by the log loader which had just dropped a load of scraps at the chipper and was backing up to turn around. The driver reported he could not hear the back-up alarm because of the combined noise of the loader and the chipper, but that under most circumstances he could hear the device. Most of the victim's co-workers were still in the building at the time of the incident. However, the incident was witnessed by a contractor who was sitting in his truck parked near the building at the time.

The loader driver did not see or hear the victim. He had been employed by the company 10 years in the same position and was noted for his safety consciousness regarding the log loader. It is estimated the loader was backing up at a rate of 8-10 mph. Noise inside the cab was measured at 80 dBa the day of the investigation.

The victim was helped to a stack of logs by the driver and the witness. While sitting/leaning upon some logs, the victim removed his earplugs. He was treated for shock by a physician on the grounds and 911 was called, with EMS arriving minutes later. The victim was transferred to area hospital and later to larger medical center. He lived five days and died in the operating room at 7:16 pm on 23 November 1994, of acute cardiovascular collapse.

CAUSE OF DEATH

The victim died of as a result of injuries sustained in a log loader run over. Injuries included fractured pelvis, femur, hip, acetabulum, and an L-1 compression fracture.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Instruct employees to remove ear plugs when a leaving high noise area. Courses on hearing protection should also be offered.

Discussion #1: In this case it is thought that the victim did not hear the audible warning device as he left the mill. Assuming the device worked the day of the incident, it is possible that after working an 8 hour shift where the noise is attenuated 31% by the foam ear plugs, then walking outside where the chipper whined at over 95 dBa, it is possible that the victim did not hear the device. Co-workers suggested that inattention was a factor because the victim was excited about going hunting that evening. However, if he had removed his ear plugs as he exited the building, the victim may have noted the back up alarm and moved out of its path.

Safety training courses offered by the employer should include noise and hearing conservation. The one hour *Employee Training For The Hearing Conservation Amendment* course offered by Kentucky OSH Education and Training Services would satisfy the annual training requirements for those employees exposed to noise in excess of 85 dBa for an eight hour time weighted average. Although an eight hour sample was not taken, spot measurements in the mill were between 93 and 100 dBa. Therefore, training is recommended. Included in the training should be instructions on when to remove personal protective equipment to avoid injury.

Recommendation #2: Install the loudest possible back up warning device, visible signals, such as a rotating beacon should be added to equipment which is routinely operated in a noisy environment.

Discussion #2: After-market warning devices are available from equipment dealers and, if installed, would increase notification to employees of potential hazards. Although the unit was equipped with an adequate audible warning device per OSHA 1910.265(c) (30) (ii) and it was in operable condition, it may not have been audible above the surrounding noise level. The noise of the high-pitched chipper may have exceeded the sound of the back up warning device on the day of the incident. Measurements taken with a Brhel and KjFr

Precision Sound Level Meter Type 2232 showed environmental noise (from all sources) at around 85 dBa. Adjustable Audio Warning Devices are available as after-market products for this machine. The cost is about \$97.00 per unit. These units are adjustable between 97 and 112 dBa.

Visible warning devices, suggested by OSHA 1910.165 Appendix A -2. for physically impaired individuals, which operate on a 12 volts, are available as after market products from equipment dealers. These rotating beacon or strobe lights would offer a visible warning signal, alerting employees in the vicinity. The cost is about \$125.00 for a strobe and \$75.00 for a rotating light. These units are magnetically mounted and operate on a 12-volt system.

Recommendation #3: A safety training course on the log loader should be offered. Safe operating procedures and hazard recognition should be a part of the course.

Discussion #3: As part of the quarterly safety meetings, information on the hazards of log loaders may have alerted the victim to the potential danger of the log loader. Routine safety training for loader drivers should be mandatory.

Recommendation #4: Employers should consider diverting foot traffic away from log loader path ways.

Discussion #4: In this case, the path taken by employees from the mill to the parking area crosses the log loader path to the chipper at 90 degrees. Diverting the path taken by employees would reduce the collision hazard. Even if employees are hard of hearing, eliminating the potential by re-directing foot traffic may prevent future injury to employees.

REFERENCES

Brhel and KjFr Precision Sound Level Meter, Type 2232, EC 651 Type 1, Corresponding Calibrator, Made in Denmark.

OSHA 1910.265 (C) (30) (ii) Vehicle Warning Signals.

OSHA 1910.165 Appendix A - 2. Alarm Signal Alternatives.